

CLAIMS

[1] A camera module comprising a plurality of single lenses and a plurality of imaging regions in one-to-one correspondence with the plurality of single lenses, wherein the plurality of single lenses form images of a subject in the plurality of imaging regions, respectively, and electrical signals from the plurality of imaging regions are synthesized so as to obtain an image, the camera module further comprising:

a lens holder that holds the plurality of single lenses; and
an imaging device holder that holds the plurality of imaging regions,
10 wherein the lens holder and the imaging device holder are disposed so as to be opposed to each other,
the lens holder comprises a member different from a member of the imaging device holder, and a linear expansion coefficient of a material of the lens holder is substantially equal to a linear expansion coefficient of a
15 material of the imaging device holder, and
the materials of the lens holder and the imaging device holder are different from a material of the plurality of single lenses.

[2] The camera module according to claim 1 that measures a distance to the subject by comparing the electrical signals from the plurality of imaging regions.
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[3] The camera module according to claim 1, wherein the lens holder and the imaging device holder are both made of silicon.
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[4] The camera module according to claim 1, further comprising a spacer between the lens holder and the imaging device holder.

[5] The camera module according to claim 1, wherein the plurality of single lenses are made of a resin so that the plurality of single lenses are
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independent of and separated from one another.

[6] The camera module according to claim 1, further comprising a plurality of color filters in one-to-one correspondence with the plurality of
5 single lenses,

wherein at least one of the plurality of color filters lets red wavelength range light enter in the imaging region, at least another color filter lets green wavelength range light enter in the imaging region and at least still another color filter lets blue wavelength range light enter in the
10 imaging region.

[7] The camera module according to claim 6, wherein at least two of the plurality of color filters let light in a same wavelength range pass therethrough.

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[8] The camera module according to claim 1, wherein each of the plurality of single lenses comprises diffraction gratings on both sides.

[9] The camera module according to claim 1, wherein optical axes of the plurality of single lenses are perpendicular to photoreceptive faces of the
20 corresponding imaging regions, respectively, and pass substantially through centers of the corresponding imaging regions, respectively.

[10] The camera module according to claim 1, further comprising:
25 a detector that detects a focal position of an subject image;
an actuator that changes an interval between the lens holder and the imaging device holder along an optical axis; and
a controller that controls the actuator in accordance with the focal position detected by the detector.

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[11] The camera module according to claim 3, wherein the spacer prevents the imaging region from receiving light passing through the single lenses other than the single lens corresponding to the imaging region.

5 [12] The camera module according to claim 1, wherein a coating for suppressing surface reflection is applied to a face of the lens holder opposed to the imaging device holder and a face of the imaging device holder opposed to the lens holder.

10 [13] The camera module according to claim 12,
wherein the coating comprises a single layer film with a refractive index of 2.1 and a thickness of 140 nm, and
the single layer film is made of a material selected from the group consisting of zinc sulfide, cerium oxide, tantalum oxide and titanium oxide.

15 [14] The camera module according to claim 1,
wherein the lens holder that holds the plurality of single lenses is obtained by sandwiching the lens holder between a pair of molding pieces, followed by injection molding of a resin within a cavity formed with the lens
20 holder and the pair of molding pieces.

[15] The camera module according to claim 1,
wherein the lens holder that holds the plurality of single lenses is obtained by sandwiching the lens holder between a pair of molding pieces,
25 filling a cavity formed with the lens holder and the pair of molding pieces with an ultraviolet curing resin, and curing the ultraviolet curing resin by irradiation with ultraviolet rays.